DEFENSE INFORMATION SYSTEMS AGENCY
P. O. BOX 4502
ARLINGTON, VIRGINIA 22204-4502

IN REPLY REFER TO: Joint Interoperability Test Command (JTE) **9 Mar 10**

MEMORANDUM FOR DISTRIBUTION

SUBJECT: Special Interoperability Test Certification of the Unique Communications Configuration Accounting Information Retrieval System (CAIRS) with Software Release 4.0

References: (a) DOD Directive 4630.5, "Interoperability and Supportability of Information Technology (IT) and National Security Systems (NSS)," 5 May 2004
(b) CJCSI 6212.01C, "Interoperability and Supportability of Information Technology and National Security Systems," 8 March 2006
(c) through (e), see Enclosure 1

1. References (a) and (b) establish the Defense Information Systems Agency, Joint Interoperability Test Command (JITC), as the responsible organization for interoperability test certification.

2. The Unique Communications CAIRS with Software Release 4.0 is hereinafter referred to as the system under test (SUT). The SUT met the interface and functional requirements for a Customer Premises Equipment (CPE) telecommunications management system as set forth in Reference (c). The SUT is certified only with specified Nortel, Alcatel-Lucent, and Avaya digital switching systems listed within this document and listed on the Unified Capabilities (UC) Approved Products List (APL). Only the Work Order Processing and Response (WOPR) Automatic Switch Interface (ASI), Universal Collection Engine (UCE), and Morale Call Minder System were tested and are certified by the JITC. The SUT also offers the following applications but were not tested or certified by the JITC: Call Accounting, Web Work Order, Enhanced WEB 411, Unique Financial System, Unique Call Identification (UCID)911, and Subscriber Portal. Testing was conducted using test procedures derived from Reference (d). No other configurations, features, or functions, except those cited within this report, are certified by the JITC. This certification expires upon changes that affect interoperability, but no later than three years from the date of this memorandum.

3. This finding is based on interoperability testing conducted by JITC, review of the vendor's Letters of Compliance (LoC), and Defense Information Assurance (IA)/Security Accreditation Working Group (DSAWG) accreditation. Interoperability testing was conducted by JITC at the Global Information Grid Network Test Facility, Fort Huachuca, Arizona, from 31 August through 18 September 2009. Review of the vendor's LoC was completed on

30 September 2009. DSAWG grants accreditation based on the security testing completed by DISA-led IA test teams and published in a separate report, Reference (e). DSAWG accreditation was granted on XX February 2010.

4. The SUT is certified with all software versions of the digital switching systems depicted in Table 1 which are on the UC APL. Functional Requirements used to evaluate the interoperability of the SUT and the interoperability statuses are depicted in Table 2.

Table 1. SUT Certified Switching System Configurations

Switch Name (See note.)	Network Management Functions	Interface
Nortel CS2100	Fault Management, Configuration Management, Automated Message Accounting, and Performance Management	EIA-232 Serial Asynchronous
Nortel CS1000M, CS1000M-SG, Succession DSN M1 Option 61C, and Succession DSN M1 Option 81C	Fault Management, Configuration Management, Automated Message Accounting, and Performance Management	EIA-232 Serial Asynchronous
Nortel CS1000E, CS1000M-Cabinet, CS1000M-Chassis, Succession DSN M1 Option 11C Cabinet, and Succession DSN M1 Option 11C chassis	Fault Management, Configuration Management, Automated Message Accounting, and Performance Management	EIA-232 Serial Asynchronous
Alcatel-Lucent 5ESS, CDX	Fault Management, Configuration Management, Automated Message Accounting, and Performance Management	EIA-232 Serial Asynchronous
Alcatel-Lucent 5ESS VCDX	Fault Management, Configuration Management, Automated Message Accounting, and Performance Management	IEEE 802.3u Ethernet
Avaya S8720, S8710, S8700	Fault Management, Configuration Management, Automated Message Accounting, and Performance Management	IEEE 802.3u Ethernet

NOTE: The SUT is certified with all software versions of these digital switching systems which are listed on the UC APL with one exception: The SUT is certified with the Nortel CS2100 with the TDM interfaces only. This excludes VoIP end instruments and the MG9K IP Gateway.

LEGEND:

5ESS	Class 5 Electronic Switching System	IEEE	Institute of Electrical and Electronics Engineers
802.3u	Standard for carrier sense multiple access with collision detection at 100 Mbps	IP	Internet Protocol
APL	Approved Products List	M1	Meridian 1
CS	Communication Server	Mbps	Megabits per second
CDX	Compact Digital Exchange	MG9K	Media Gateway 9000
DCE	Data Circuit-terminating Equipment	SG	Single Group
DSN	Defense Switched Network	SUT	System Under Test
DTE	Data Terminal Equipment	TDM	Time Division Multiplexing
EIA	Electronic Industries Alliance	UC	Unified Capabilities
EIA-232	Standard for defining the mechanical and electrical characteristics for connecting DTE and DCE data communications devices	VCDX	Very Compact Digital Exchange
		VoIP	Voice over Internet Protocol

Table 2. SUT Functional Requirements and Interoperability Status

Interface	Critical	Certified	Functional Requirements	Status	UCR Reference
Serial EIA-232	No[1]	Yes	In accordance with EIA-232 (C)	Met	5.2.8.1
			Fault Management (C)	Met	5.2.8.3
			Configuration Management (Switch Access) (C)	Met	5.2.8.4
			Automated Message Accounting (C)	Met	5.2.8.5
			Performance Management (C)	Met	5.2.8.6
IEEE 802.3 Ethernet	No[1]	Yes	In Accordance with IEEE 802.3 (C)	Met	5.2.8.1
			Fault Management (C)	Met	5.2.8.3
			Configuration Management (Switch Access) (C)	Met	5.2.8.4
			Automated Message Accounting (C)	Met	5.2.8.5
			Performance Management (C)	Met	5.2.8.6
IEEE 802.3u Ethernet	No[1]	Yes	In Accordance with IEEE 802.3u (C)	Met	5.2.8.1
			Fault Management (C)	Met	5.2.8.3
			Configuration Management (Switch Access) (C)	Met	5.2.8.4
			Automated Message Accounting (C)	Met	5.2.8.5
			Performance Management (C)	Met	5.2.8.6
2-Wire Analog (GR-506-CORE)	No[1]	Yes	MLPP in accordance with UCR, Section 5.2.2 (C)	Met	5.2.12.3.5
			FCC Part15/Part 68 (R)	Met	5.2.12.3.5
			DTMF outpulsing in accordance with GR-506-CORE (C)	Met	5.2.12.3.5, 5.2.4.4.1, 5.2.4.4.2
			DISR compliance as applicable (R)	Met	5.2.12.3.5
			Devices that support auto answer shall be settable for four ROUTINE rings in accordance with UCR, Section 5.2.2.3 (C)	Met	5.2.12.3.5
			Devices that support precedence calls above ROUTINE precedence, shall respond properly to an incoming alerting (ringing) precedence call cadence as described in UCR 2008, Section 5.2.4.5.1, Ringing.(C)	Met	5.2.12.3.5
			EIA/TIA-470-B (R)	Met	5.2.12.3.5.2
	Yes	Yes	Security (R)	See note 2.	Section 3

NOTES:
1 The SUT is a CPE device that provides network monitoring functions. Therefore, the SUT interfaces are based on the UCR, section 5.2.8.1. The Network Management interoperability requirement can be met with any of the following interfaces: Ethernet, asynchronous serial, or synchronous serial. The functional requirements are based on the UCR, sections 5.2.8 and 5.2.12.3.
2 Security is tested by DISA-led Information Assurance test teams and published in a separate report, Reference (e).

LEGEND:

802.3	Standard for carrier sense multiple access with collision detection at 10 Mbps	EIA/TIA-470-B	Performance and Compatibility Requirements for Telephone Sets with Loop Signaling
802.3u	Standard for carrier sense multiple access with collision detection at 100 Mbps	FCC	Federal Communications Commission
C	Conditional	GR	Generic Requirement
CPE	Customer Premises Equipment	GR-506-CORE	LSSGR: Signaling for Analog Interfaces
DCE	Data Circuit-terminating Equipment	IEEE	Institute of Electrical and Electronics Engineers
DISA	Defense Information Systems Agency	LoC	Letters of Compliance
DISR	Department of Defense Information Technology Standards Registry	LSSGR	Local Access and Transport Area (LATA) Switching Systems Generic Requirements
DTE	Data Terminal Equipment	Mbps	Megabits per second
DTMF	Dual Tone Multifrequency	MLPP	Multi-Level Precedence and Preemption
EIA	Electronic Industries Alliance	R	Required
EIA-232	Standard for defining the mechanical and electrical characteristics for connecting DTE and DCE data communications devices	SUT	System Under Test
		TIA	Telecommunications Industry Association
		UCR	Unified Capabilities Requirements

5. JITC distributes interoperability information via the JITC Electronic Report Distribution (ERD) system, which uses Unclassified-But-Sensitive Internet Protocol Router Network

(NIPRNet) e-mail. More comprehensive interoperability status information is available via the JITC System Tracking Program (STP). The STP is accessible by .mil/.gov users on the NIPRNet at https://stp.fhu.disa.mil. Test reports, lessons learned, and related testing documents and references are on the JITC Joint Interoperability Tool (JIT) at http://jit.fhu.disa.mil (NIPRNet), or http://199.208.204.125 (SIPRNet). Information related to DSN testing is on the Telecom Switched Services Interoperability (TSSI) website at http://jitc.fhu.disa.mil/tssi.

6. The JITC point of contact is Mr. Joseph Roby, DSN 879-0507, commercial (520) 538-0507, FAX DSN 879-4347, or e-mail to joseph.roby@disa.mil. The JITC's mailing address is P.O. Box 12798, Fort Huachuca, AZ 85670-2798. The tracking number for the SUT is 0901601.

FOR THE COMMANDER:

2 Enclosures a/s

for RICHARD A. MEADOR
Chief
Battlespace Communications Portfolio

Distribution (electronic mail):
Joint Staff J-6
Joint Interoperability Test Command, Liaison, TE3/JT1
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Department of the Army, Office of the Secretary of the Army, DA-OSA CIO/G-6 ASA (ALT), SAIS-IOQ
U.S. Marine Corps MARCORSYSCOM, SIAT, MJI Division I
DOT&E, Net-Centric Systems and Naval Warfare
U.S. Coast Guard, CG-64
Defense Intelligence Agency
National Security Agency, DT
Defense Information Systems Agency, TEMC
Office of Assistant Secretary of Defense (NII)/DOD CIO
U.S. Joint Forces Command, Net-Centric Integration, Communication, and Capabilities Division, J68
Defense Information Systems Agency, GS23

ADDITIONAL REFERENCES

(c) Office of the Assistant Secretary of Defense, "Department of Defense Unified Capabilities Requirements 2008," 22 January 2009

(d) Joint Interoperability Test Command, "Defense Switched Network Generic Switch Test Plan (GSTP) Change 2," 2 October 2006

(e) Joint Interoperability Test Command, Memo, "Information Assurance (IA) Assessment of Unique Communications Configuration Accounting Information Retrieval System (CAIRS) with Software Release 4.0 (Tracking Number 0901601)," XX February 2010

CERTIFICATION TESTING SUMMARY

1. SYSTEM TITLE. Unique Communications Configuration Accounting Information Retrieval System (CAIRS) with Software Release 4.0; hereinafter referred to as the system under test (SUT).

2. PROPONENT. Space and Naval Warfare (SPAWAR) Assistant Program Manager for Shore Telephony.

3. SPONSOR. Ms. Shirley Dolengo, PEO C4I PMW 790, OT4 Room 2043
4301 Pacific Highway San Diego, CA 92110, e-mail: shirley.dolengo@navy.mil.

4. TESTER. Joint Interoperability Test Command (JITC), Fort Huachuca, Arizona.

5. SYSTEM UNDER TEST DESCRIPTION. The SUT manages small, medium, and large scale enterprise networks from local, regional, and central locations. The SUT can be modularly configured to allow sites to choose various configurations to meet their specified requirements. The SUT functions as a central telecommunications management system and database which includes:

- work orders/trouble tickets
- asset management
- switch assignments

The SUT web integrated work order deployment system provides customers and users the ability to track work order progress from the request to final implementation. The SUT offers the following applications: Work Order Processing and Response (WOPR) Automatic Switch Interface (ASI), Universal Collection Engine (UCE), Call Accounting, Web Work Order, Enhanced WEB 411, Unique Financial System, Morale Minder System, Unique Call Identification (UCID)911, and Subscriber Portal. Only the WPOR, ASI, UCE, and Morale Call Minder System were tested and are certified by the JITC. The SUT is composed of the following components:

a. Database Server. The Database Server is a Microsoft Structured Query Language (SQL) 2005 Server, which runs on Windows Server 2003 SP2. All database transactions from CAIRS 4.0 are logged on the Database Server to include activity logs, security logs, and call data.

b. Fault and Reporting Server. The Fault and Reporting Server is a centralized monitoring and performance analysis system for the Private Branch Exchange (PBX) and switch devices located throughout the infrastructure. The Fault and Reporting Server provides all actions for centralized alarming, notification, logging and performance reporting by providing a unified interface to monitor the infrastructure in a graphical manner.

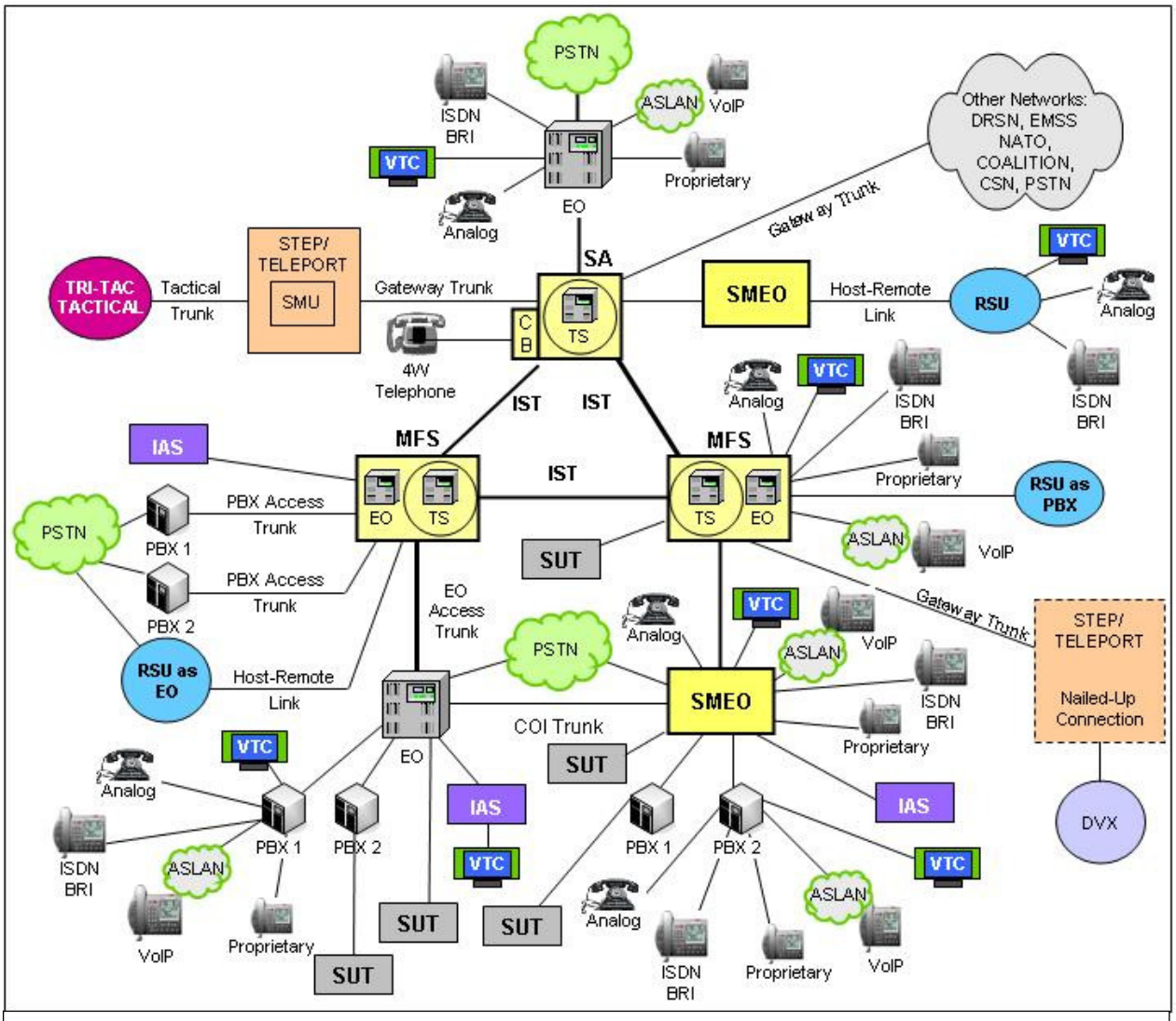
c. Application Server. The Application Server is the primary platform and central system for all CAIRS 4.0 modules. The CAIRS 4.0 CAIRS Enterprise Server (CES) is a centralized management system that manages system functionality, subscriber and directory administration, order and trouble ticket administration, device management, cable connectivity management, switch administration, inventory management, and billing management. The CAIRS 4.0 CES uses Active Server Pages (ASP).NET web services to connect to all CAIRS 4.0 enterprise clients, and Windows services to perform server side processes such as scheduling and WOPR-ASI connectivity. The Application Server uses a UCE, which collects call records, traffic, and alarm data from the PBX switch as well as Secure Maintenance Access (SMA), which is a terminal emulator that allows for secure remote access for administration of the PBX switch. The CAIRS 4.0 CES is built on the Microsoft .NET Framework 2.0, runs on the Internet Information Services (IIS) 6.0 server, and uses Microsoft SQL Server 2005 as its database.

d. Management Workstation. The workstation is a site-provided standalone Personal Computer (PC), with Windows XP Pro SP3 or Windows Vista SP2 installed as the operating system and runs with Microsoft NET Framework 2.0. The workstation also contains the CAIRS Application, which is the primary interface for users and administrators.

e. CAIRS Connection Unit (CCU). The CCU acts as a remote communication/ connection unit between the CAIRS Application and the PBX switch. The CCU uses WOPR-ASI, UCE, and SMA as the Application Server. The CCU is also required if the Morale Minder system is being used. The Morale Minder system allows for calls based on the minute amount established by the Morale Minder administrator, the call time values are monitored and then deducted from the calling party's minute balance electronically. Calls exceeding their allowed length are automatically disconnected. Reminders of total time used and remaining minutes, inform the callers before calls are disconnected.

f. Teleboss 850. The Teleboss 850 is a Unix-based buffer box used in conjunction with the Application and Database Server to act as a buffer agent for call records and a secure pass through device to the PBX and switches. The Teleboss 850 acts as an Internet Protocol (IP) to serial terminal server that collects, buffers, and distributes data from the site’s telephony infrastructure. It also supports the monitoring of collected data for traffic patterns and then makes proper notifications based on configured traffic situations.

6. OPERATIONAL ARCHITECTURE. The Unified Capabilities Requirements (UCR) Defense Switched Network (DSN) architecture in Figure 2-1 depicts the relationship of the SUT to the DSN switches.



LEGEND:

4W	4-Wire
ASLAN	Assured Services Local Area Network
BRI	Basic Rate Interface
CB	Channel Bank
COI	Community of Interest
CSN	Canadian Switch Network
DRSN	Defense Red Switch Network
DSN	Defense Switched Network
DVX	Deployable Voice Exchange
EMSS	Enhanced Mobile Satellite System
EO	End Office
IAS	Integrated Access Switch
ISDN	Integrated Services Digital Network
IST	Interswitch Trunk
MFS	Multifunction Switch
NATO	North Atlantic Treaty Organization
PBX	Private Branch Exchange
PBX 1	Private Branch Exchange 1
PBX 2	Private Branch Exchange 2
PSTN	Public Switched Telephone Network
RSU	Remote Switching Unit
SA	Standalone
SMEO	Small End Office
SMU	Switched Multiplex Unit
STEP	Standardized Tactical Entry Point
SUT	System Under Test
Tri-Tac	Tri-Service Tactical Communications Program
TS	Tandem Switch
VoIP	Voice over Internet Protocol
VTC	Video Teleconferencing

Figure 2-1. DSN Architecture

7. REQUIRED SYSTEM INTERFACES. Requirements specific to the SUT and interoperability results are listed in Table 2-1. These requirements are derived from Reference (c) and verified through the test procedures listed in Reference (d) and vendor submission of Letters of Compliance (LoC).

Table 2-1. SUT Functional Requirements and Interoperability Status

Interface	Critical	Certified	Functional Requirements	Status	UCR Reference
Serial EIA-232	No[1]	Yes	In accordance with EIA-232 (C)	Met	5.2.8.1
			Fault Management (C)	Met	5.2.8.3
			Configuration Management (Switch Access) (C)	Met	5.2.8.4
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IEEE 802.3 Ethernet	No[1]	Yes	In Accordance with IEEE 802.3 (C)	Met	5.2.8.1
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IEEE 802.3u Ethernet	No[1]	Yes	In Accordance with IEEE 802.3u (C)	Met	5.2.8.1
			Fault Management (C)	Met	5.2.8.3
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2-Wire Analog (GR-506-CORE)	No[1]	Yes	MLPP in accordance with UCR, Section 5.2.2 (C)	Met	5.2.12.3.5
			FCC Part15/Part 68 (R)	Met	5.2.12.3.5
			DTMF outpulsing in accordance with GR-506-CORE (C)	Met	5.2.12.3.5, 5.2.4.4.1, 5.2.4.4.2
			DISR compliance as applicable (R)	Met	5.2.12.3.5
			Devices that support auto answer shall be settable for four ROUTINE rings in accordance with UCR, Section 5.2.2.3 (C)	Met	5.2.12.3.5
			Devices that support precedence calls above ROUTINE precedence, shall respond properly to an incoming alerting (ringing) precedence call cadence as described in UCR 2008, Section 5.2.4.5.1, Ringing.(C)	Met	5.2.12.3.5
			EIA/TIA-470-B (R)	Met	5.2.12.3.5.2
	Yes	Yes	Security (R)	See note 2.	Section 3

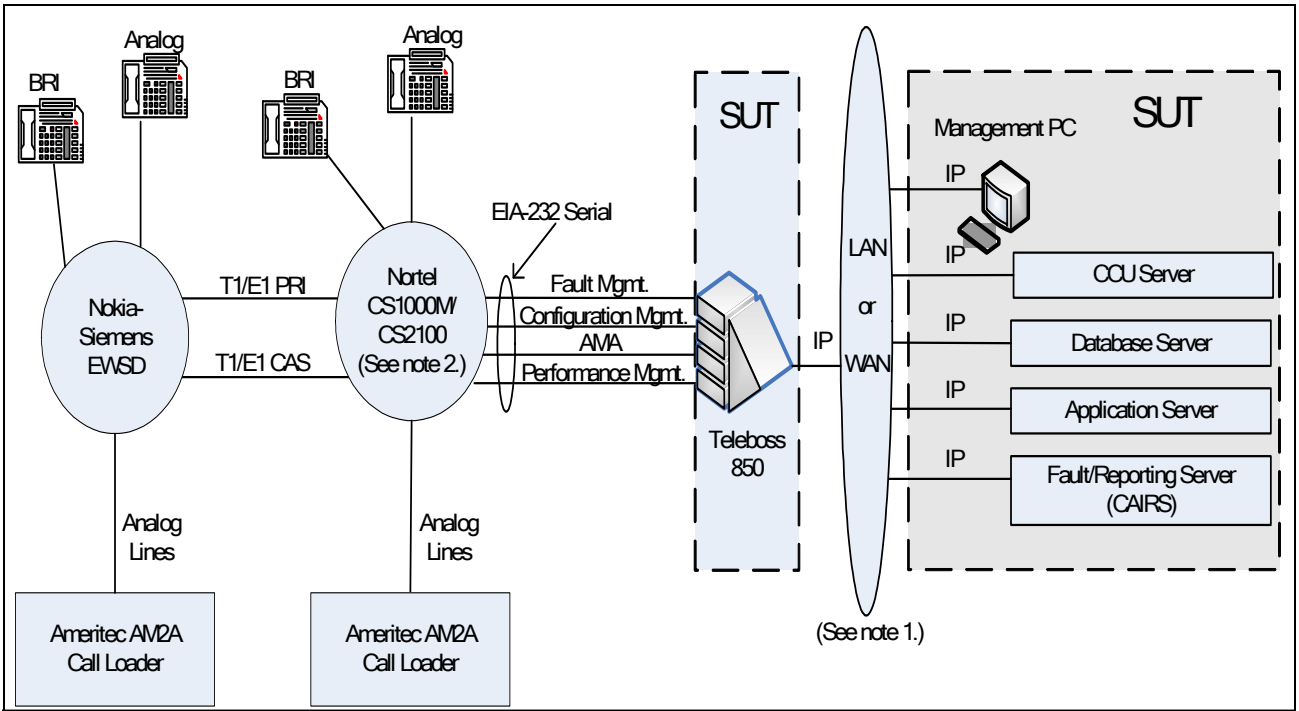
NOTES:
1 The SUT is a CPE device that provides network monitoring functions. Therefore, the SUT interfaces are based on the UCR, section 5.2.8.1. The Network Management interoperability requirement can be met with any of the following interfaces: Ethernet, asynchronous serial, or synchronous serial. The functional requirements are based on the UCR, sections 5.2.8 and 5.2.12.3.
2 Security is tested by DISA-led Information Assurance test teams and published in a separate report, Reference (e).

Table 2-1. SUT Functional Requirements and Interoperability Status

LEGEND:

802.3	Standard for carrier sense multiple access with collision detection at 10 Mbps	EIA/TIA-470-B	Performance and Compatibility Requirements for Telephone Sets with Loop Signaling
802.3u	Standard for carrier sense multiple access with collision detection at 100 Mbps	FCC	Federal Communications Commission
C	Conditional	GR	Generic Requirement
CPE	Customer Premises Equipment	GR-506-CORE	LSSGR: Signaling for Analog Interfaces
DCE	Data Circuit-terminating Equipment	IEEE	Institute of Electrical and Electronics Engineers
DISA	Defense Information Systems Agency	LoC	Letters of Compliance
DISR	Department of Defense Information Technology Standards Registry	LSSGR	Local Access and Transport Area (LATA) Switching Systems Generic Requirements
DTE	Data Terminal Equipment	Mbps	Megabits per second
DTMF	Dual Tone Multifrequency	MLPP	Multi-Level Precedence and Preemption
EIA	Electronic Industries Alliance	R	Required
EIA-232	Standard for defining the mechanical and electrical characteristics for connecting DTE and DCE data communications devices	SUT	System Under Test
		TIA	Telecommunications Industry Association
		UCR	Unified Capabilities Requirements

8. TEST NETWORK DESCRIPTION. The SUT was tested at JITC's Global Information Grid Network Test Facility in a manner and configuration similar to that of the DSN operational environment. Testing the system's required functions and features was conducted using the test configurations depicted in Figures 2-2 through 2-6. Figure 2-2 depicts the Nortel Communication Server (CS)1000M/CS2100 serial interface test configuration. Figure 2-3 depicts the Alcatel-Lucent Class 5 Electronic Switching System (5ESS) Compact Digital Exchange (CDX) serial interface test configuration. Figure 2-4 depicts the Alcatel-Lucent 5ESS Very Compact Digital Exchange (VCDX) IP interface test configuration. Figure 2-5 depicts the Avaya S8720 IP interface test configuration. Figure 2-6 depicts the SUT Morale Minder System test configuration.



NOTES:

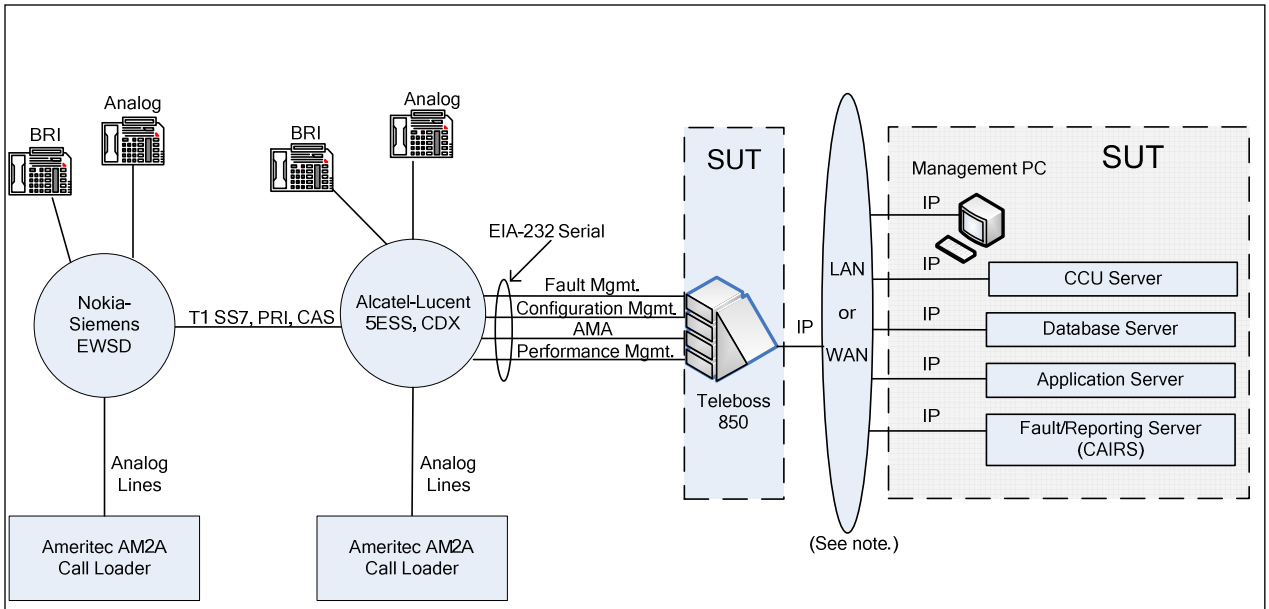
1 LAN/ WAN is used for remote access when the CAIRS client is not co-located with the switch.

2 The SUT is certified with the Nortel CS2100 with the TDM interfaces only. This excludes VoIP end instruments and the MG9K IP Gateway.

LEGEND:

AM2A	Ameritec 2 Analog
AMA	Automated Message Accounting
BRI	Basic Rate Interface
CAIRS	Configuration Accounting Information Retrieval System
CAS	Channel Associated Signaling
CCU	CAIRS Connection Unit
CS	Communication Server
E1	European Basic Multiplex Rate (2.048 Mbps)
EIA	Electronic Industries Alliance
EIA-232	Standard for defining the mechanical and electrical characteristics for connecting Data Terminal Equipment (DTE) and Data Circuit-terminating Equipment (DCE) data communications devices
EWSD	Elektronisches Wählsystem Digital
IP	Internet Protocol
LAN	Local Area Network
Mbps	Megabits per second
Mgmt.	Management
PC	Personal Computer
PRI	Primary Rate Interface
SUT	System Under Test
T1	Digital Transmission Link Level 1 (1.544 Mbps)
TDM	Time Division Multiplexing
WAN	Wide Area Network

Figure 2-2. SUT Nortel CS1000M/CS2100 EIA-232 Serial Test Configuration

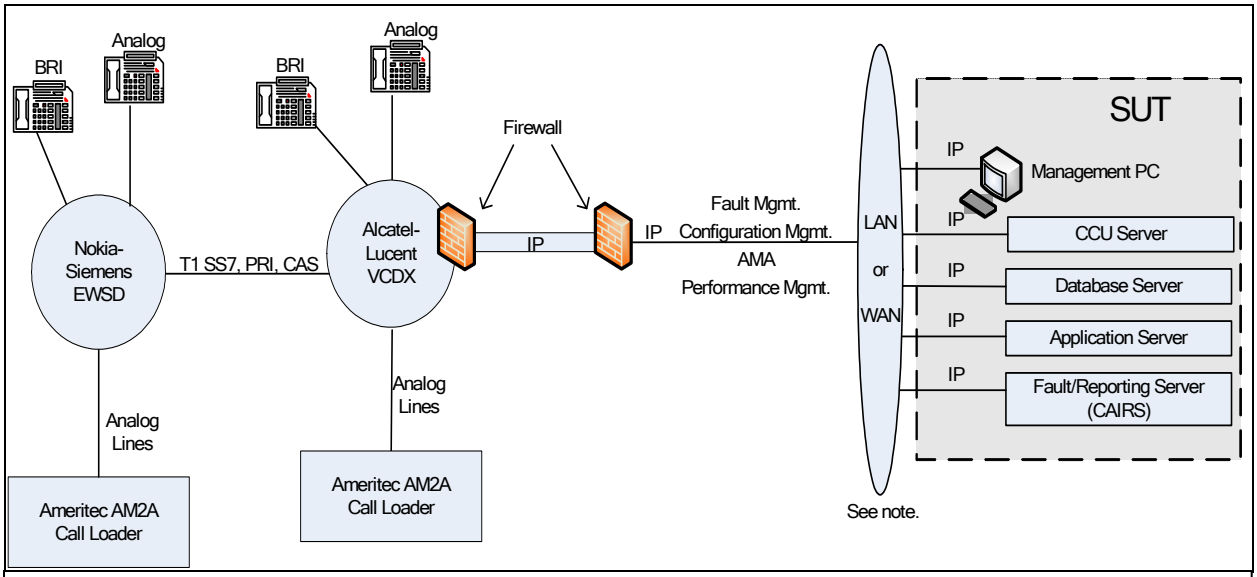


NOTE: LAN/ WAN is used for remote access when the CAIRS client is not co-located with the switch.

LEGEND:

5ESS	Class 5 Electronic Switching System
AM2A	Ameritec 2 Analog
AMA	Automated Message Accounting
BRI	Basic Rate Interface
CAIRS	Configuration Accounting Information Retrieval System
CAS	Channel Associated Signaling
CCU	CAIRS Connection Unit
CDX	Compact Digital Exchange
EIA	Electronic Industries Alliance
EIA-232	Standard for defining the mechanical and electrical characteristics for connecting Data Terminal Equipment (DTE) and Data Circuit-terminating Equipment (DCE) data communications devices
EWSD	Elektronisches Wählsystem Digital
IP	Internet Protocol
LAN	Local Area Network
Mbps	Megabits per second
Mgmt.	Management
PC	Personal Computer
PRI	Primary Rate Interface
SS7	Signaling System 7
SUT	System Under Test
T1	Digital Transmission Link Level 1 (1.544

Figure 2-3. SUT Alcatel Lucent 5ESS CDX EIA-232 Serial Test Configuration

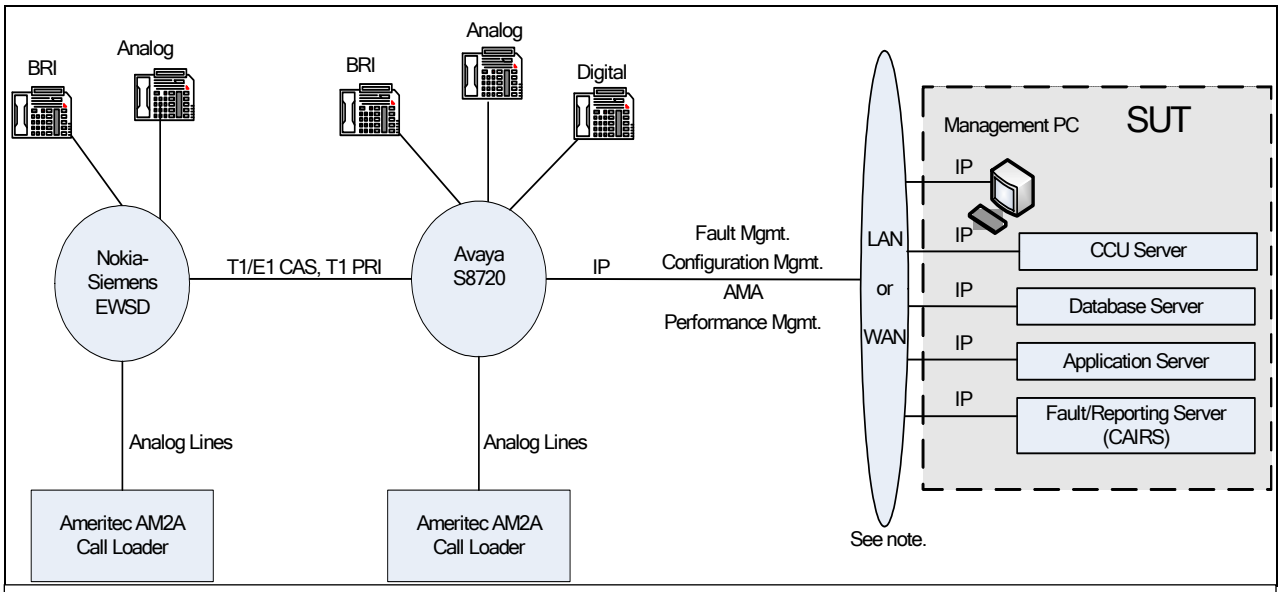


NOTE: LAN/ WAN is used for remote access when the CAIRS client is not co-located with the switch.

LEGEND:

5ESS	Class 5 Electronic Switching System
AM2A	Ameritec 2 Analog
AMA	Automated Message Accounting
BRI	Basic Rate Interface
CAIRS	Configuration Accounting Information Retrieval System
CAS	Channel Associated Signaling
CCU	CAIRS Connection Unit
EWSD	Elektronisches Wählsystem Digital
IP	Internet Protocol
LAN	Local Area Network
Mbps	Megabits per second
Mgmt.	Management
PC	Personal Computer
PRI	Primary Rate Interface
SS7	Signaling System 7
SUT	System Under Test
T1	Digital Transmission Link Level 1 (1.544 Mbps)
VCDX	Very Compact Digital Exchange
WAN	Wide Area Network

Figure 2-4. SUT Alcatel Lucent 5ESS VCDX IP Test Configuration

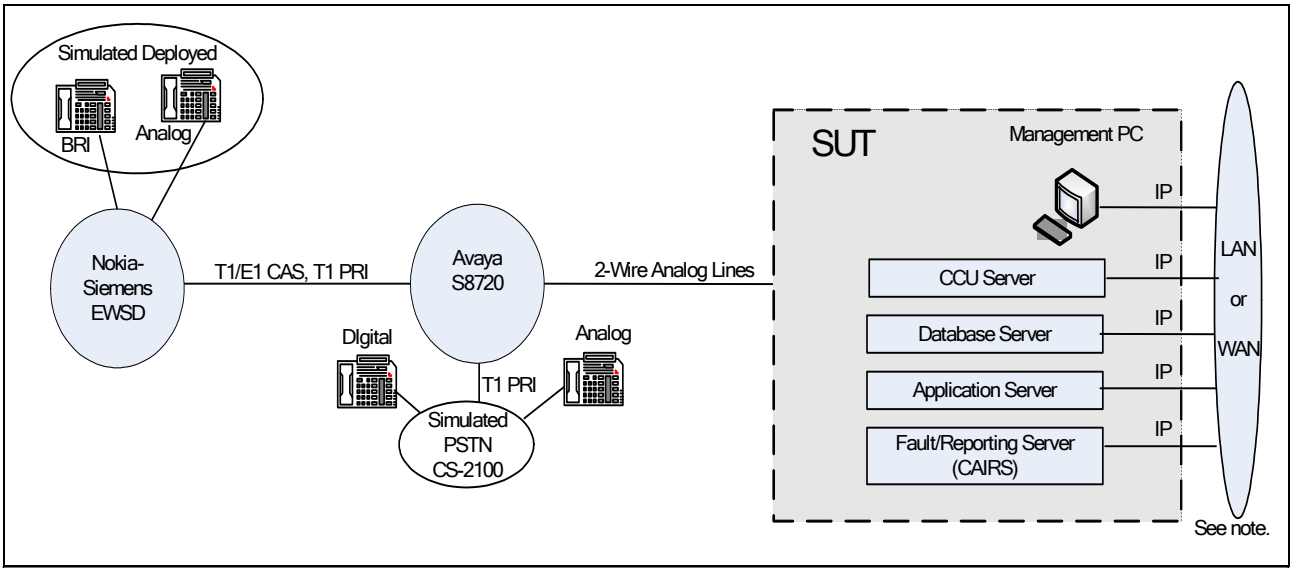


NOTE: LAN/ WAN is used for remote access when the CAIRS client is not co-located with the switch.

LEGEND:

AM2A	Ameritec 2 Analog
AMA	Automated Message Accounting
BRI	Basic Rate Interface
CAIRS	Configuration Accounting Information Retrieval System
CAS	Channel Associated Signaling
CCU	CAIRS Connection Unit
E1	European Basic Multiplex Rate (2.048 Mbps)
EWSD	Elektronisches Wählsystem Digital
IP	Internet Protocol
LAN	Local Area Network
Mbps	Megabits per second
Mgmt.	Management
PRI	Primary Rate Interface
SUT	System Under Test
T1	Digital Transmission Link Level 1 (1.544 Mbps)
WAN	Wide Area Network

Figure 2-5. SUT Avaya S8720 IP Test Configuration



NOTE: LAN/ WAN is used for remote access when the CAIRS client is not co-located with the switch.

LEGEND:

AM2A	Ameritec 2 Analog
BRI	Basic Rate Interface
CAIRS	Configuration Accounting Information Retrieval System
CAS	Channel Associated Signaling
CCU	CAIRS Connection Unit
E1	European Basic Multiplex Rate (2.048 Mbps)
EWSD	Elektronisches Wählsystem Digital
IP	Internet Protocol
LAN	Local Area Network
Mbps	Megabits per second
PC	Personal Computer
PRI	Primary Rate Interface
SUT	System Under Test
T1	Digital Transmission Link Level 1 (1.544 Mbps)
WAN	Wide Area Network

Figure 2-6. SUT Morale Minder System Test Configuration

9. SYSTEM CONFIGURATIONS. Table 2-2 provides the system configurations, hardware, and software components tested with the SUT. The SUT was tested in an operationally realistic environment to determine interoperability with a complement of DSN switches noted in Table 2-2. Table 2-2 lists the DSN switches which depict the tested configuration and is not intended to identify the only switches that are certified with the SUT. The SUT is certified with switching systems listed in Table 2-3 which are on the Unified Capabilities (UC) Approved Products List (APL).

Table 2-2. Tested System Configurations

System Name	Hardware/Software Release
Nokia-Siemens EWSD	Release 19d, Patch Set 46
Alcatel-Lucent 5ESS/CDX/VCDX	5E16.2 Broadcast Warning Message (BWM) 08-0010
Nortel CS2100	Succession Enterprise (SE) 09
Nortel CS1000M	5.0
Avaya S8720	Communication Manager (CM) 4.0 (R014x.00.2.731.7: Super Patch 14419)

Table 2-2. Tested System Configurations (continued)

	Hardware	Card Name / Part Number/Name	Software/Firmware
Unique CAIRS Enterprise Rel. 4.0	Database Server	Dell PowerEdge 860	Windows Server 2003 SP2
			Microsoft SQL Server 2005
			.Net Framework 2.0
	Fault and Reporting Server	HP ProLiant ML330	Linux Red Hat ES 4.0
			CAIRS Fault and Performance
	Application Server	Dell PowerEdge 860	Windows Server 2003 SP2
			.Net Framework 2.0
			IIS 6.0
			Unique Collection Engine 1.5
			WOPR 4.0
			SMA
	XP or Vista Management Workstation (Site provided)	NA	Windows XP SP3 or Windows Vista SP2
			.Net Framework 2.0
			CAIRS 4.0 client
	CAIRS Communication Unit	HP ProLiant DL120	Windows Server 2003 SP2
			.Net Framework 2.0
			SMA
		Intel Dialogic D/120JCT-LS Combined Media Board	Unique Collection Engine 1.5
			WOPR 4.0
			CAIRS OSS MoraleMinder 3.012
	Teleboss 850	NA	Version 2.05.492

LEGEND:

5ESS	Class 5 Electronic Switching System	NA	Not Applicable
CAIRS	Configuration Accounting Information Retrieval System	OSS	Operational Support Software
		SMA	Secure Maintenance Access
CDX	Compact Digital Exchange	SP	Service Pack
CS	Communication Server	SQL	Structured Query Language
ES	Enterprise Server	VCDX	Very Compact Digital Exchange
EWSD	Elektronisches Wählsystem Digital	WOPR	Work Order Processing and Response
HP	Hewlett Packard	XP	Experience
IIS	Internet Information Services		

Table 2-3. SUT Certified Switching System Configurations

Switch Name (See note.)	Network Management Functions	Interface
Nortel CS2100	Fault Management, Configuration Management, Automated Message Accounting, and Performance Management	EIA-232 Serial Asynchronous
Nortel CS1000M, CS1000M-SG, Succession DSN M1 Option 61C, and Succession DSN M1 Option 81C	Fault Management, Configuration Management, Automated Message Accounting, and Performance Management	EIA-232 Serial Asynchronous
Nortel CS1000E, CS1000M-Cabinet, CS1000M-Chassis, Succession DSN M1 Option 11C Cabinet, and Succession DSN M1 Option 11C chassis	Fault Management, Configuration Management, Automated Message Accounting, and Performance Management	EIA-232 Serial Asynchronous
Alcatel-Lucent 5ESS, CDX	Fault Management, Configuration Management, Automated Message Accounting, and Performance Management	EIA-232 Serial Asynchronous
Alcatel-Lucent 5ESS VCDX	Fault Management, Configuration Management, Automated Message Accounting, and Performance Management	IEEE 802.3u Ethernet
Avaya S8720, S8710, S8700	Fault Management, Configuration Management, Automated Message Accounting, and Performance Management	IEEE 802.3u Ethernet

Table 2-3. SUT Certified Switching System Configurations (continued)

NOTE: The SUT is certified with all software versions of these digital switching systems which are listed on the UC APL with one exception: The SUT is certified with the Nortel CS2100 with the TDM interfaces only. This excludes VoIP end instruments and the MG9K IP Gateway.

LEGEND:

5ESS	Class 5 Electronic Switching System	IEEE	Institute of Electrical and Electronics Engineers
802.3u	Standard for carrier sense multiple access with collision detection at 100 Mbps	IP	Internet Protocol
		M1	Meridian 1
APL	Approved Products List	Mbps	Megabits per second
CS	Communication Server	MG9K	Media Gateway 9000
CDX	Compact Digital Exchange	SG	Single Group
DCE	Data Circuit-terminating Equipment	SUT	System Under Test
DSN	Defense Switched Network	TDM	Time Division Multiplexing
DTE	Data Terminal Equipment	UC	Unified Capabilities
EIA	Electronic Industries Alliance	VCDX	Very Compact Digital Exchange
EIA-232	Standard for defining the mechanical and electrical characteristics for connecting DTE and DCE data communications devices	VoIP	Voice over Internet Protocol

10. TEST LIMITATIONS. None.

11. TEST RESULTS

a. Discussion. The SUT Morale Minder application offers the Warfighter the ability to place morale, welfare, and recreation (MWR) calls from a deployed location and connect to a local Public Switched Telephone Network (PSTN) telephone number at their home base, post, camp, or station. The caller is prompted by the SUT for a Personal Identification Number (PIN) and then the caller can dial a local PSTN number to connect to the specified destination. Once the caller is connected the SUT will activate a timer that will notify the caller at specified increments and will ultimately disconnect the call after it expires. Simulated MWR calls were placed to the SUT from various DSN switching systems and then extending to a dialed telephone subscriber over the test network depicted in Figure 2-6. Once calls were completed to the SUT, they were preempted within the simulated DSN to insure that the proper preemption action occurred as required by the UCR, section 5.2.2. All preempted calls received the proper preemption notification tone and were released and returned to an idle state ready for the subsequent caller. In addition the SUT Network Management (NM) feature and capability requirements listed in the UCR, section 5.2.8, were tested to various DSN switches as depicted in Figures 2-3 through 2-5. The SUT was tested with these requirements as the NM system connected to the DSN switches.

(1) In accordance with the UCR, section 5.2.8.1, DSN switching systems shall provide DSN NM data to the Advanced DSN Integrated Management Support System (ADIMSS) via one of the three following physical interfaces: Ethernet, serial asynchronous (Electronic Industries Alliance [EIA]-232, or serial synchronous International Telecommunication Union - Telecommunication Standardization Sector [ITU-T] X.25. The SUT, as a telecommunications management system, met all critical interoperability certification requirements for physical interfaces with Ethernet and EIA-232.

(2) In accordance with the UCR, section 5.2.8.3, the DSN telephone switching systems shall detect fault conditions and generate alarm notifications. In addition to the data formats in UCR, section 5.2.8.1, alarms may be sent as Simple Network Management Protocol (SNMP) traps. The SUT met all critical interoperability certification requirements for Fault Management. Alarm notifications and log messages were captured and saved to the database server.

(3) In accordance with the UCR, section 5.2.8.4, Configuration Management in a switching system shall be in accordance with Telcordia Technologies GR-472-CORE, Network Element Configuration Management, Revision 2, Feb. 1999, Section 4. The SUT met all critical interoperability requirements for Configuration Management by connecting to the switching systems remotely and emulating their local maintenance terminals.

(4) In accordance with the UCR, section 5.2.8.5, the Automated Message Accounting (AMA) process in a switching system provides usage related data to perform customer billing and Call Detail Recording (CDR). The SUT met all critical interoperability requirements for AMA by collecting and storing CDR data on the database server.

(5) In accordance with the UCR, section 5.2.8.6, the DSN switches must meet the switch performance data requirements in the UCR, Table 5.2.8-2. The SUT met all critical interoperability requirements for Performance Management by collecting and accurately storing traffic data measurements on the database server at various time intervals (e.g. 5-, 15-, 30-minutes) as supported by the respective switches.

(6) In accordance with UCR, section 5.2.12.3.5, device(s) that support auto-answer shall have an “Auto-Answer” mode settable to a “time” more than the equivalency of four ROUTINE precedence ring intervals in accordance with UCR 2008, section 5.2.2.3, before “answer” supervision is provided. Handling of the precedence calls will be in accordance with UCR 2008, section 5.2.2.2.4.2. The SUT was able to set the auto answer to the equivalency of four ROUTINE rings which met this requirement. The SUT properly diverted precedence calls above ROUTINE to the global diversion default (e.g. attendant console, alternate directory number, night service) prior to the fourth ring.

(7) In accordance with the UCR, section 5.2.12.3.5, all DSN Customer Premise Equipment as a minimum, must meet the requirements of Part 15 and Part 68 of the FCC Rules and Regulations, and the Administrative Council for Terminal Attachments (ACTA). This requirement was met by the SUT with a vendor’s LoC.

(8) In accordance with the UCR, section 5.2.12.3.5, all DSN Customer Premise Equipment Device(s) that can “out-dial” Dual Tone Multifrequency (DTMF) and/or Dial Pulse (DP) digits (automatic and/or manual) shall comply to the requirements as stated in UCR 2008, Section 5.2.4.4.1, Dial-Pulse Signals, and Section 5.2.4.4.2, DTMF

Signaling, respectively, for its address digit generating capabilities and shall be capable of outpulsing DTMF digits specified in Telcordia Technologies GR-506-CORE, *Signaling for Analog Interfaces*, Issue 1 with Revision 1, June 1996. The SUT supports DTMF signaling and met this requirement with a vendor's LoC.

(9) In accordance with the UCR, section 5.2.12.3.5.2, CPE(s) that use loop signaling shall conform to the requirements of TIA/EIA-470-B. The SUT supports 2-wire analog DTMF signaling interfaces and met this requirement with a vendor's LoC.

(10) In accordance with the UCR, Table 5.3.1-3, Operational Administration and Maintenance (OAM) IP packets shall be tagged with a Differentiated Services Code Point (DSCP) value of 16 to 23. Using the WireShark IP capture tool to capture DSCP tagging within the SUT enclave between the Teleboss 850, Application Server, Fault and Reporting Server, and CCU, it was determined that the SUT tagged the OAM packets at 0 which does not meet this requirement. However, this discrepancy was reviewed by DISA and was adjudicated as having a minor operational impact.

b. Test Summary. The SUT met the interface and functional requirements for a Customer Premises Equipment (CPE) telecommunications management system as set forth in Reference (c). Only the WPOR, ASI, UCE, and Morale Call Minder System were tested and are certified by the JITC. The SUT is certified specifically with switching systems and their respective interfaces listed in Table 2-3.

12. TEST AND ANALYSIS REPORT. No detailed test report was developed in accordance with the Program Manager's request. JITC distributes interoperability information via the JITC Electronic Report Distribution (ERD) system, which uses Unclassified-But-Sensitive Internet Protocol Router Network (NIPRNet) e-mail. More comprehensive interoperability status information is available via the JITC System Tracking Program (STP). The STP is accessible by .mil/gov users on the NIPRNet at https://stp.fhu.disa.mil. Test reports, lessons learned, and related testing documents and references are on the JITC Joint Interoperability Tool (JIT) at http://jit.fhu.disa.mil (NIPRNet), or http://199.208.204.125 (SIPRNet). Information related to DSN testing is on the Telecom Switched Services Interoperability (TSSI) website at http://jitc.fhu.disa.mil/tssi.